

REMARKS

Claims 2-12, 15, 18 and 20-36 are pending in this application. By this Amendment, claims 1, 13, 14, 16, 17 and 19 are canceled and claims 2, 4, 15, 18, 20, 22, 31, 33 and 34 are amended.

Claims 19 and 33 stand rejected under 35 U.S.C. § 112, second paragraph. With respect to claim 19, the Patent Office asserts that the claim is missing steps that the skilled practitioner would require to carryout the method. This rejection is respectfully traversed.

First, claim 19 has been incorporated into claim 20 to clarify that the reforming catalyst is determined to be degraded if the detected temperature of the reforming catalyst is below a predetermined temperature. With respect to the Patent Office questions directed to what operational parameters are used to calculate the predetermined temperature, the specification adequately provides these teachings, for example, on pages 15-16 paragraphs [0064] and [0065]. As described therein, the ECU calculates an estimated catalyst bed temperature in the reaction portion of the reformer based on the temperature detected by a sensor located downstream of the reaction portion. The estimated catalyst bed temperature is then compared to a predetermined value. If the estimated temperature is below a predetermined value, then the catalyst is determined to be degraded. Fig. 5, as described in paragraph [0065] is one example by which a predetermined value for the catalyst bed temperature can be determined. Under normal, non-degraded catalyst conditions, the catalyst bed temperature will have a specific profile as shown by the solid line. Over time as the catalyst is degrades, the catalyst bed temperature at the same air-fuel ratio will be lower, as shown by the dashed lines in Fig. 5.

A skilled practitioner will know which temperature will be appropriate to use as the predetermined temperature based on the parameters of the reformer system chosen, such as the type of catalyst used, system flow rates and configuration, as well as the desired

performance characteristics of engine with which the reformer will be used. In view of the above, Applicants respectfully submit that claim 20, which now includes the features of original claim 19, is definite. As such, the 35 U.S.C. § 112, second paragraph, rejection of claim 19, as now might be applied to claim 20, should be withdrawn.

With respect to the 35 U.S.C. § 112, second paragraph, rejection of claim 33, this claim has been amended to depend from claim 31. The embodiments described in claims 32 and 33 are alternative methods to determine if the catalyst has degraded. As such, both claims now depend from claim 31. With respect to the Patent Office's question directed to what steps take place that allow for a temperature to increase above a set temperature and then subsequently fall below that set temperature, see, for example, page 21-22, paragraphs [0079] through [0081], and Figure 11. As described therein, when the reforming catalyst begins to degrade, such that the reaction starts to occur at the downstream end portion of the catalyst, the temperature of the downstream end portion of the catalyst increases. The temperature continues to increase until it reaches a peak temperature. The downstream end portion of the catalyst will also degrade over time, and then its temperature will begin to decrease. In view of this sufficient teaching in the specification, it is respectfully requested that the 35 U.S.C. § 112, rejection of claim 33 also be withdrawn.

Claims 1, 2, 13-17, 19, 20, 22, 23, 25, 31, 32, 34, and 35 stand rejected under 35 U.S.C. § 102(a) over Kawasumi, U.S. Patent 6,641,944. Claims 1 and 13 stand rejected under 35 U.S.C. § 102(a) over Tetsuo, JP 2000-268840. These rejections are respectfully traversed.

Neither Kawasumi nor Tetsuo teaches or suggests determining whether a catalyst is degraded by comparing a predetermined temperature to a temperature of the reforming catalyst detected by a temperature sensor and determined by a determining portion. More specifically, the claimed arrangement first calculates an estimated catalyst bed temperature in

the reaction portion of the reformer based on the temperature detected by a sensor located downstream of the reaction portion. The estimated catalyst bed temperature is then compared to a predetermined value. If the estimated temperature is below a predetermined value, then the catalyst is determined to be degraded. In contrast, both Kawasumi and Tetsuo measure the outlet temperature from its catalyst and compare it to a predetermined outlet temperature for determining whether the catalyst is degraded. Because neither Kawasumi nor Tetsuo teaches all the claimed features of independent claims 2, 4, 20, and 22, the 35 U.S.C. § 102(a) rejections should be withdrawn.

Claims 3-12, 18, and 36 stand rejected under 35 U.S.C. § 102(a) over Kawasumi, or alternatively under 35 U.S.C. § 103(a) in view of Kawasumi. Similarly, claims 3-12, 18, and 36 stand rejected under 35 U.S.C. § 102(a) over Tetsuo, or alternatively under 35 U.S.C. § 103(a) in view of Tetsuo. These rejections are respectfully traversed.

The Patent Office asserts that because both Kawasumi and Tetsuo teach a computer controller, and that these computer controllers are capable of calculating temperature rates of change and air-fuel mixture control calculations, that they either teach or suggest these claimed features. Applicants respectfully submit that this is an improper hindsight reconstruction of Applicants' claimed apparatus and methods and that the rejections should be withdrawn. Furthermore, as discussed above with respect to the 35 U.S.C. § 102(a) rejections, neither Kawasumi nor Tetsuo teaches or suggests all the claimed features of independent claims 2, 4, 20, and 22, and therefore, these same references can not anticipate or make obvious any dependent claims. In view of the above, withdrawal of the 35 U.S.C. § 102(a)/103(a) rejections of claims 3-12, 18, and 36 is respectfully requested.

Claims 2 and 14-17 stand rejected under 35 U.S.C. § 103(a) in view of Tetsuo. This rejection is respectfully traversed.

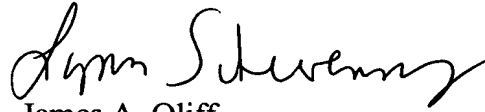
As noted above, Tetsuo fails to teach or suggest a reforming catalyst degradation determining apparatus that determines whether a catalyst is degraded by comparing a predetermined temperature to a temperature of the reforming catalyst detected by the temperature sensor and determined by a determining portion. As such, this 35 U.S.C. § 103(a) rejection should be withdrawn.

Claims 24, 26-30, and 33 are said to be allowable if rewritten to overcome the 35 U.S.C. § 112, second paragraph rejection and include all the limitations of the base claims and any intervening claims. Applicants note that the list of allowable claims listed on page 8 of the Office Action differs from the list of objected claims listed on the Summary sheet of the Office Action. In view of the claim amendments and the remarks presented herein, Applicants respectfully submit that claims 20, 21, 24, 26-30, and 33 (as listed on the Summary sheet) are allowable.

In view of the foregoing, it is respectfully submitted that this application is in condition for allowance. Favorable reconsideration and prompt allowance are earnestly solicited.

Should the Examiner believe that anything further would be desirable in order to place this application in even better condition for allowance, the Examiner is invited to contact the undersigned at the telephone number set forth below.

Respectfully submitted,



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Attachment:

Amendment Transmittal

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